

### Exercise 1.3

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Question 1: Express each of the following decimals in the form p/q:

(i) 0.39

(ii) 0.750

(iii) 2.15

(iv) 7.010

(v) 9.90

(vi) 1.0001

Solution:

(i)

$$0.39 = 39/100$$

(ii)

$$0.750 = 750/1000 = 3/4$$

(iii)

$$2.15 = 215/100 = 43/20$$

(iv)

$$7.010 = 7010/1000 = 701/100$$

(v)

$$9.90 = 990/100 = 99/10$$

(vi)

$$1.0001 = 10001/10000$$

Question 2: Express each of the following decimals in the form p/q:

(i)  $0.\overline{4}$       (ii)  $0.\overline{37}$

(iii)  $0.\overline{54}$       (iv)  $0.\overline{621}$

(v)  $125.\overline{3}$       (vi)  $4.\overline{7}$

(vii)  $0.\overline{47}$

Solution:

(i) Let  $x = 0.\overline{4}$

$$\text{or } x = 0.\overline{4} = 0.444 \dots (1)$$

Multiplying both sides by 10

$$10x = 4.444 \dots (2)$$

Subtract (1) by (2), we get

$$10x - x = 4.444\dots - 0.444\dots$$

$$9x = 4$$

$$x = 4/9$$

$$\Rightarrow 0.\overline{4} = 4/9$$

(ii) Let  $x = 0.3737.. \dots$  (1)

Multiplying both sides by 100

$$100x = 37.3737.. \dots (2)$$

Subtract (1) from (2), we get

$$100x - x = 37.3737.. \dots - 0.3737.. \dots$$

$$100x - x = 37$$

$$99x = 37$$

$$x = 37/99$$

(iii) Let  $x = 0.5454.. \dots$  (1)

Multiplying both sides by 100

$$100x = 54.5454.. \dots (2)$$

Subtract (1) from (2), we get

$$100x - x = 54.5454.. \dots - 0.5454.. \dots$$

$$99x = 54$$

$$x = 54/99$$

(iv) Let  $x = 0.621621.. \dots$  (1)

Multiplying both sides by 1000

$$1000x = 621.621621.. \dots (2)$$

Subtract (1) from (2), we get

$$1000x - x = 621.621621.. \dots - 0.621621.. \dots$$

$$999x = 621$$

$$x = 621/999$$

$$\text{or } x = 23/37$$

(v) Let  $x = 125.3333.. \dots$  (1)

Multiplying both sides by 10

$$10x = 1253.3333.. \dots (2)$$

Subtract (1) from (2), we get

$$10x - x = 1253.3333.. \dots - 125.3333.. \dots$$

$$9x = 1128$$

$$\text{or } x = 1128/9$$

$$\text{or } x = 376/3$$

(vi) Let  $x = 4.7777.. \dots$  (1)

Multiplying both sides by 10

$$10x = 47.7777.. \dots (2)$$

Subtract (1) from (2), we get

$$10x - x = 47.7777\dots - 4.7777\dots$$

$$9x = 43$$

$$x = 43/9$$

(vii) Let  $x = 0.47777\dots$

Multiplying both sides by 10

$$10x = 4.7777\dots \quad \dots(1)$$

Multiplying both sides by 100

$$100x = 47.7777\dots \quad (2)$$

Subtract (1) from (2), we get

$$100x - 10x = 47.7777\dots - 4.7777\dots$$

$$90x = 43$$

$$x = 43/90$$

